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age or Venetian remains, apparently the foundation of a tower; and on a slight eminence to the westward, close to the shore, we found several rock sepulchres. In this vicinity a large portion of the rock has been quarried away, but with so very gradual a slope towards the sea, that it would almost appear as if intended to be continued down to the water's edge, for a slip to haul up the boats.

Slight as is the information contained in these pages, I cannot conclude without expressing how much I am indebted to my indefatigable assistants, Messrs. Stokes and Wyer, for their zealous aid, not only in all the operations of the survey, but in our mutual endeavours to acquire a competent knowledge of the interior as well as of the hydrographic features of the island of Skyros.

XV.—*The Formigas Bank, near Santa Maria (Azores)*. By Capt. ALEX. VIDAL, R.N. (Communicated by Rear-Admiral Beaufort.)

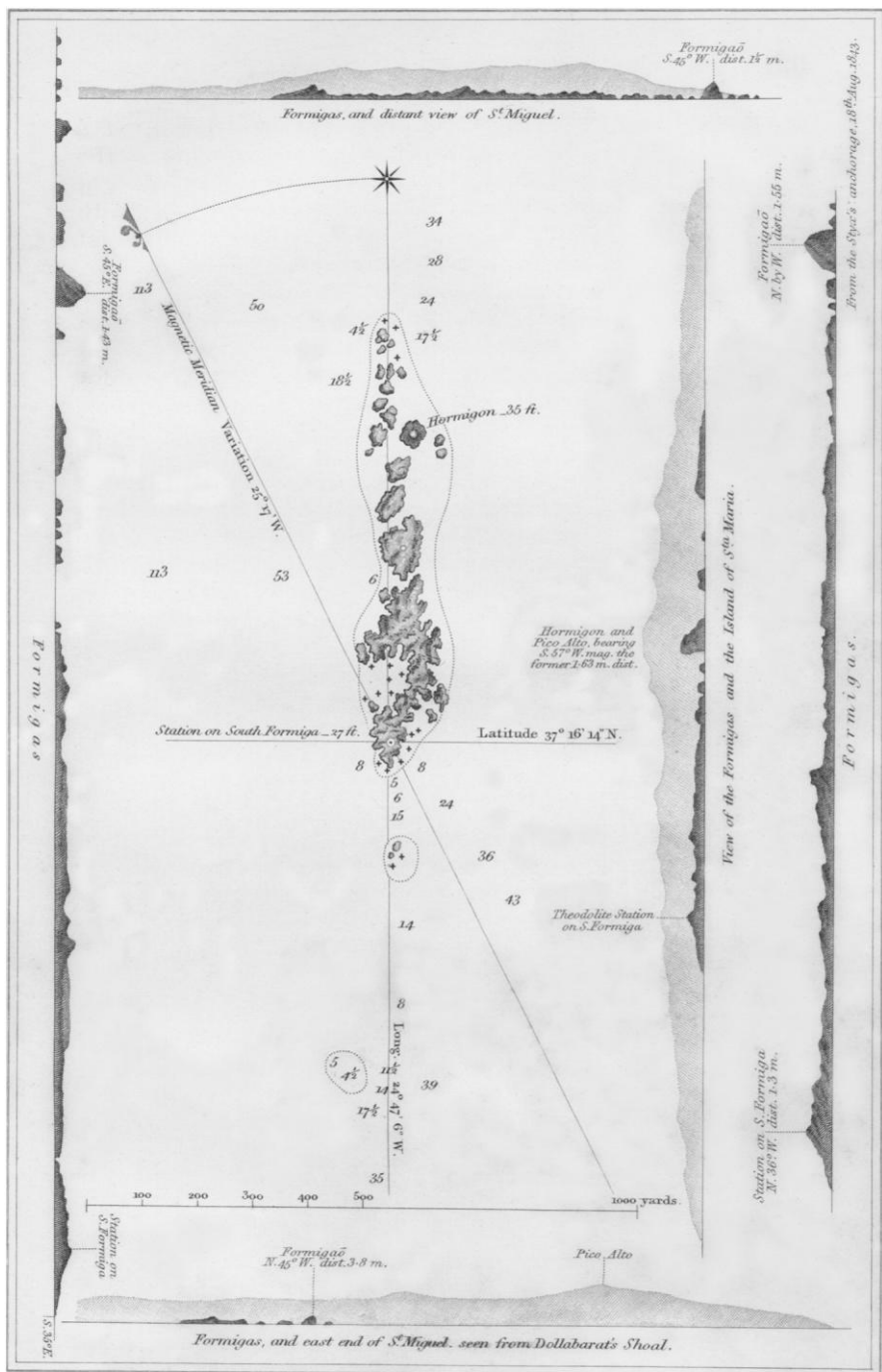
[Read 23rd April, 1849.]

THE bank of the Formigas lies N. $45^{\circ} 15'$ E. from the island of Santa Maria,* at the distance of 19·7 miles from Matos, its N.E. and nearest point.

It is formed by a submarine mountain of very irregular elevation, and which, traced to the depth of 200 fathoms, was found to extend $6\frac{1}{2}$ miles from N.W. to S.E., by about 3 miles in greatest breadth.

Near its western margin there is a narrow cluster of black rocks, known as the Formigas, which are about 800 yards in length by 150 in extreme breadth; their relative direction being north and south. The southernmost of them for about 350 yards forms a rather closely connected mass, having a small bay on the west. The northern ones are more separated from each other, and all are comparatively of little elevation, but their profile exhibits a few hummocks. That on their southern extremity, which is 27 feet above low-water springs, afforded a theodolite station, at which the true bearings of some points and heights on Santa Maria and San Miguel were ascertained. It is in latitude $37^{\circ} 16' 14''$ N., longitude $27^{\circ} 47' 06''$ W., and from observations made upon it on two consecutive days of very favourable weather, the following true bearings are derived:—Pico-alto, the highest peak on Santa Maria,

* For an account of the Islands of Santa Maria and St. Miguel, with Maps, vide Mr. Consul Hunt's Papers in the fifteenth volume of this Journal.—Ed.



S. $40^{\circ} 37' 39''$ W.; Pico Castello, at the S.E. extremity of that island, S. $29^{\circ} 04' 09''$ W.; and Pico Vara, the highest land near the east end of San Miguel, N. $32^{\circ} 12' 21''$ W.; the latter peak being 38.1 miles distant, and Pico Alto 23.4 miles.

The magnetic variation at this station, from a mean of both days' results, on the 17th and 18th August, 1843, was $25^{\circ} 17'$ W.

The most elevated rock of the group, named by Tofiño Hermigon, is 35 feet in height, and stands on their eastern side, about 200 yards from the northernmost rock, somewhat more isolated than the others, and having an inclination to the southward. (See the very faithful views which are inserted on the chart, and give a representation of them far preferable to a description.)

With smooth water there is no difficulty in landing, particularly on the southern rocks, but in strong winds or a high swell the sea rolls over them all, leaving a black naked surface entirely devoid of vegetation. One hundred and thirty yards south of the southern Formiga is a small rocky shoal, some parts of which are visible at low water: the channel between it and the rock has 5 to 6, and 15 fathoms water over the ridge which connects them, the greatest depth being near mid-channel. Again, 600 yards or about three-tenths of a mile south of the South Formiga is another small rocky patch having $4\frac{1}{2}$ fathoms upon it at low water. It is steep to on the east, west, and south, but on a line drawn from it to the Formigas the soundings are very irregular, 11, 8, and 14 fathoms.

On the north the Formigas may be approached within a few yards, but a narrow ridge runs out from them in that direction for about 400 yards, with varying depths upon it, but no dangers. The outer extremity of this ridge has 18 fathoms on it, with the northernmost rock bearing *south* about 300 yards distant. Immediately north of this it drops quickly into 30 and then 50 fathoms. On the meridian of the rocks soundings extend off to the distance of one mile and eight-tenths. On the east and west they are quite clear, with deep water close up to them; but on the west, the edge of the bank is not more than half a mile off, and at the distance of 200 yards from them the depth on it will be found about 50 fathoms.

S. $47^{\circ} 07'$ E. $3\frac{1}{4}$ miles from the station on the hammock of the South Formiga is the western head of a very dangerous shoal named Dollabarats. It consists of two or three rocky heads or knolls which at low-water springs have only 11 feet water on them. At that time of tide their position is marked by several large white patches, which may be distinctly seen, especially so in bright sunny weather.

This shoal is near the southern end of a rocky ridge, which extends from it N. $15^{\circ} 30'$ E. 1 mile and 6-10ths. The soundings over it are most irregular, varying from 14 to 28 and 30 fathoms with 45 and 50 close to its edges; but there are no actual dangers upon it except those comprised within the dotted line which is drawn around the shoal. See the chart.

The whole bank of the Formigas, as we have already stated, is a submarine mountain, and its varied elevations approach the surface of the ocean in several places. The shoal of Dollabarats is however the most eastern of these ridges, and the mountain has a steep but tolerably regular descent from it to the N.E., E., S.E., and S.; the south-eastern slope being the most gradual.

The ridge next in extent to that of Dollabarats lies one mile and a tenth to the S.E. of the South Formiga. Its southern limit is on a line drawn from that rock to Dollabarats, and it runs from thence one mile N. 15° E., which is nearly the same direction as the Dollabarats ridge.

The least water found upon it was 16 fathoms, but the depths vary from that to 28 fathoms, beyond which it deepens abruptly on all sides. At its north end there are 18 fathoms, and next east 44. Off its south end are two detached patches very small, the one has 28 and the other 30 fathoms on it.

Another but smaller ridge occurs half a mile on the west side of Dollabarats, between it and that last described. It is nearly 7-10ths of a mile in length, very narrow, and the depth upon it ranges from 27 to 32 fathoms. Its general direction is about N. 10° E.

The quality of the bottom over the bank of the Formigas is principally rock, with frequent casts of fine white sand, broken shells, and small pieces of the branch coral common in our latitudes.

The Dollabarats shoal is a very insidious danger in smooth water, but in stormy weather the seas break over it with great violence.

It seemed desirable to ascertain whether this bank was connected with the island of Santa Maria at any fathomable depths, and a line of soundings was tried across the channel between them, but no bottom could be obtained with 300 fathoms of line.

A difference exists in the position of the Formigas as given by us, and that assigned to them by Tofiño in his '*Derrotero de las islas Azores*.' The great Spanish hydrographer states in that work that from the southern Formiga the Ponta Castello bears S. $24^{\circ} 30'$ W., and Pico Alto S. $34^{\circ} 30'$ W.; the former being $4^{\circ} 34'$, and the latter $6^{\circ} 07'$ less westerly than ours.

This discrepancy induced a repetition of our observations on the following day, and they gave the same result. The navigator may therefore place the utmost confidence in the integrity of our position.

In the same work the Spanish admiral writes thus on the subject of the Dollabarats shoal:—"The pilots of Santa Maria agree that there is deep water all about the Formigas, except to the S.E., where there is a shoal on which the sea at times breaks violently, but having searched for it and carefully sounded the bank with two of them on board who sought for the shoalest water, we nowhere found less depth than 15 fathoms."

The plan before us confirms the report of the Portuguese pilots too truly; our vessel was anchored close to the danger, and the boats traversed in all directions over the shoals at low water, during the greater part of a very fine day. A beacon flag was placed on the middle of the ridge connected with Dollabarats shoal, to enable us to fix the soundings; and it is hoped the chart will be sufficient evidence that the whole subject has been properly investigated.

Mr. Purdy, in his memoir of the North Atlantic, informs us, "that to the S.S.E. of the Formiga there is a danger which was shown on a chart of the Atlantic Ocean of 1766, but afterwards omitted in other charts from want of positive information as to its existence. This shoal was seen by P. Dollabarats, commander of the ship 'La Marie de Sebaure,' in 1788, on his return from Martinique to Bayonne."

We may here observe, that the rocks of the Formigas, and the breakers upon *them* and upon Dollabarats shoal, are frequently seen by the inhabitants of Santa Maria from their eastern cliffs. The Formigas were pointed out to us when at work there, and angles were taken to them by theodolite from two or three stations above those cliffs.

In the memoir by Mr. Purdy, just referred to, there is another danger reported in the vicinity of the Formigas, under the name of the Tulloch Reef, as follows:—"In 1808, Captain William Tulloch, in the brig *Equator*, of Portsmouth, New Hampshire, on a voyage from Madeira to St. Michaels, was alarmed by some of his crew seeing breakers. After altering his course, he still saw breakers ahead, and as it blew too hard to haul by the wind and weather them, he determined as his only chance to endeavour to push through among them. Accordingly, having taken in every sail excepting the foretopsail, he went to the foretopmast head himself, and conned his vessel safely through by luffing up and keeping away as he saw necessary. Captain Tulloch counted distinctly twenty-one

heads of rocks, none of which appeared to have much water over them, and two of the rocks show occasionally above water, in the wash of the sea. Their extent the Captain thinks did not exceed half a mile from North to South, and was still less from East to West. They bore E.N.E. by compass, from the highest rock of the Formigas then in sight, distant about 10 miles, and appeared very black below water. The breakers on the Tulloch Rocks have been stated to have been seen several times since 1808; among others by the Ayrshire, bound from the Clyde to Demerara. Mr. Ferguson, the mate of that ship, gives their situation at about *nine* miles E.N.E. by compass from the Formigas. Captain J. Henderson, commanding the ship Fortescue, from Mauritius to London, saw the Tulloch Rocks on the 17th April, 1829. Breakers were observed for half a mile East and West. The greater Formiga and breakers in one bore W.S.W. (by compass), the former about four leagues, and the latter two miles distant. There appeared to be several heads near the surface of the water. A westerly wind and a heavy groundswell prevented sounding."

Such is the principal evidence collected by Mr. Purdy for the existence of this danger, but he adds—"Notwithstanding all that has been asserted as to the existence of this reef, it was not found by Captain Wilkes, in 1838, as the following extract from his work will show:—"On the night of the 13th September we laid by just after passing the north end of St. Michaels, in order to examine the position of the Tulloch Reef by daylight. We passed within a mile and a half of its reported position, but saw nothing of it, although the sea was running sufficiently high to have made a heavy break on it if it did exist.'"

From the report of Mr. Henderson, commander of the Fortescue, to the Secretary at Lloyds, on this subject, some application appears to have been made to the Admiralty, for we have in our possession a copy of Mr. Henderson's letter to the Secretary, and also a copy of a letter from Captain Marryat to his Commander-in-Chief in relation to this danger, which it seems he had received orders to seek and examine. He dates his letter from His Majesty's ship *Ariadne*, in Plymouth Sound, 18th July, 1829, and therein makes the following communication:—"On the 8th inst. we arrived off St. Mary; and, on the ensuing morning, being a perfect calm and the Formigas rocks about five or six miles to the eastward, I dispatched Mr. Thomas (Master) with his assistants in the first and second cutters to ascertain the existence of the reef described to have been seen in that direction. A light breeze springing up in the forenoon, I followed the boats in His

Majesty's ship 'Ariadne,' running 18 miles from the Formigas, and the next day beat up to within three miles of the above rocks, and again bore up, on the track of the supposed danger, until they were out of sight from the mast-head."

So soon as the survey of the Formigas and the whole bank on which they stand had been completed, our attention was directed to this reported danger.

Captain Tulloch of the 'Equator,' and Mr. Ferguson of the 'Ayrshire,' both state the reef to bear E.N.E. by compass from the Formigas, and nine to ten miles distant. Captain Henderson of the 'Fortescue' says the greater Formiga and the reef were in one bearing W.S.W. by compass, the former 4 *leagues* the latter 2 *miles*, or as before. The shoal 10 miles E.N.E. by compass from the Formigas. The search was therefore commenced on that line of bearing, and starting from the Formigas, was carried out under steam 14½ miles until they were lost sight of. The vessel on an average was stopped at every mile and a quarter, and soundings tried for with 200 fathoms of line. There were look-outs at the mast-heads and on the paddle-boxes, the former about 90, the latter 27 feet above the sea. She then returned to the Formigas, traversing *across* the line of bearing previously carried out, making trials for soundings as before, but no soundings were obtained, nor was there any indication of shoal water.

On the 20th August the assigned position of the danger was again passed over with look-outs as before, but without using the lead. On the 25th the space was for the third time traversed, on lines not previously described by the vessel, and extended to the distance of 21 miles to the E.N.E. of the Formigas, the lead kept going at intervals to the depth of 320 fathoms.

Finally on the 29th August another traverse was made across the E.N.E. bearing to a distance of 12 miles from the Formigas, cutting in between the previous tracks and trying for soundings, but limiting the lines to 200 fathoms. There was not throughout this search the slightest indication of a shoal.

We must express our opinion upon this reputed danger, as formerly upon the apparently well authenticated statements relative to the Aitkin's rock. It looks very like a whale, but seeing the great difficulty there is in discovering small rocks beneath the surface of the ocean, we by no means presume to assert that Tulloch's reef does not exist, but we entertain a very decided opinion that it will not be found in the position which has been assigned to it.

Before leaving this subject we would urge upon sea officers, to whatever service or nation they may belong, the great benefit

they will confer on society at large, and their own profession particularly, if, when they do fall in with dangers of the above description, they would make more sacrifice for their *investigation*. The non-verification of such dangers when fallen in with, by every means in the seaman's power, appears to us a dereliction of duty—a great public wrong.

To find a sunken rock in the ocean with such uncertain data as many reports of them afford, is a very difficult matter; and the attempt to do so is attended with very great trouble and very great expense.

XVI.—On the *Regio Cinnamomifera* of the Ancients. By W. DESBOROUGH COOLEY. Communicated by Admiral Sir Charles Malcolm.

[Read April 23, 1849.]

WHEN we look at the eastern angle of Africa as represented in ancient maps, and see the successive portions of it throughout an extent of 600 miles, on the southern side of the gulf of Aden, marked as the *Myrrh country*, the *Frankincense country*, and the *Cinnamon region*,—the extreme eastern point being at the same time named *Aromata*, or *Fragrant gums*, we cannot avoid concluding that the whole region in question was known chiefly as the source of those odorous productions from which its several appellations were derived. A geographical nomenclature so significant, and of such extent, is too remarkable to be passed over without explanation; yet what explanation does it admit of, except that it indicates the objects of a commercial intercourse carried on with a land otherwise nameless and devoid of interest? The African trade in spices and aromatic drugs was concealed for ages by the jealousy of those through whose hands it passed, and it was not till the monopoly of the Arabs in those seas began to yield to the activity of the Greeks and to the Roman arms, that the course of the native traffic became fully revealed to view. It is the purpose of this paper to show that the aromatic productions named above—cinnamon in particular—were obtained chiefly from the northern part of the country now possessed by the Somáli, at the eastern angle of Africa; and that the trade in those productions may be traced back to a very early period of history.

The writers who have hitherto given attention to the spice trade of the ancients have been all misled, more or less, by the supposition that the name cinnamon has, in all times and places, been invariably given to the same commodity. In order to avoid as much as possible the fallacies arising from